

Idaho Department of Fish and Game
April - June, 2005

Kootenai River Fisheries Recovery Investigations

Quarterly Progress Report and Summary of Activities

Project Personnel:

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Field Work Completed or in Progress and Summary of Results

White Sturgeon

Kootenai River white sturgeon monitoring and evaluation efforts during the spring period included adult sampling, ultrasonic telemetry and egg mat sampling. Other research efforts included the initiation of a study to determine adequate flow and substrate requirements for successful egg hatching and larval recruitment.

Adult sturgeon sampling began in February and continued into June. One hundred fifty six adult white sturgeon were collected with setlines and angling. Surgical procedures were performed on a sub-sample of the adults to determine sex and stage of maturity. Twenty-four of the white sturgeon sampled were females, 26 were males, and 6 were of unknown sex. Thirty-five of the 150 adults sampled were new fish, and not previously captured. Total length ranged from 121 to 241 cm and weight ranged from 10 to 85 kg.

Seven adult white sturgeon were tagged with Vemco ultrasonic transmitters in 2005 and their movements were continuously

monitored within the Kootenai River system. Beginning in 2003 and continuing into 2005, an array of passive Vemco sonic receivers was deployed from Kootenay Lake, British Columbia upstream into Idaho (Figure 1). This array allows continuous monitoring of sturgeon movements within the Kootenai River system and into Kootenay Lake. Figures 2 through 4 illustrate movement patterns of three adult white sturgeon from the pre-spawn period into the spawning season. All three of the females illustrated in figures 2 through 4 moved upstream to near Ambush (rkm 244.5) during the spawning period.

Four egg release sites were selected prior to the 2005 white sturgeon spawning season. Selection criteria included rock and gravel substrates with minimum water velocities of 1 m/s at 170 cms discharge calculated at Bonners Ferry. Four sites were selected that met these criteria and a total of 1,056,700 eggs from 10 females (10 releases – 22 families) were fertilized on site and released (Figure 5, Table 1). Discharge

from Libby dam has remained above 500 cms for the duration of this study and sampling conditions have been extremely difficult. To date, no white sturgeon embryos or larvae have been collected.

Activities planned for the next quarter include sampling for larval white

sturgeon with d-ring and ½ meter plankton nets and seines, gill netting, Vemco telemetry receiver downloading and maintenance, and adult capture and tagging at the Kootenai River delta in British Columbia.

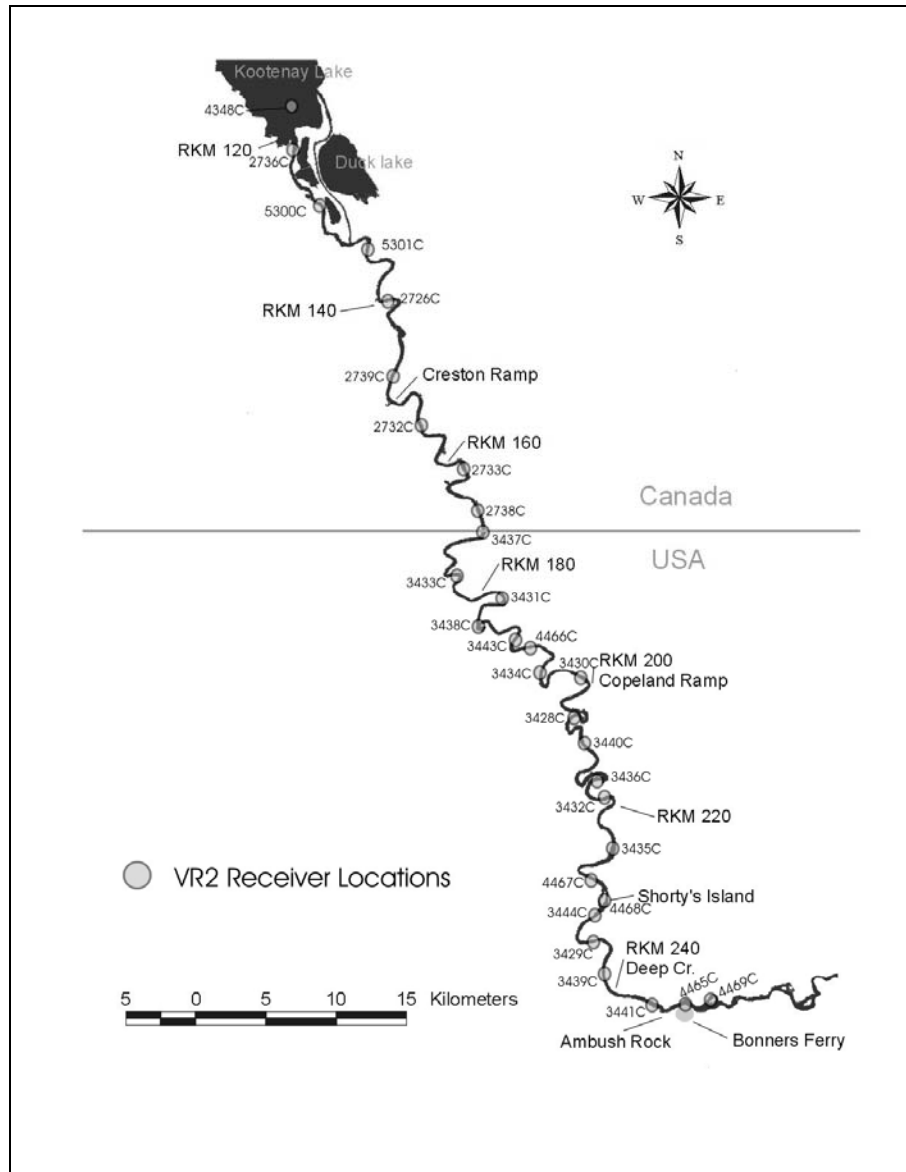


Figure 1. Locations of sonic receivers (Model VR2, Vemco brand) in Idaho and British Columbia, Kootenai River, 2005.

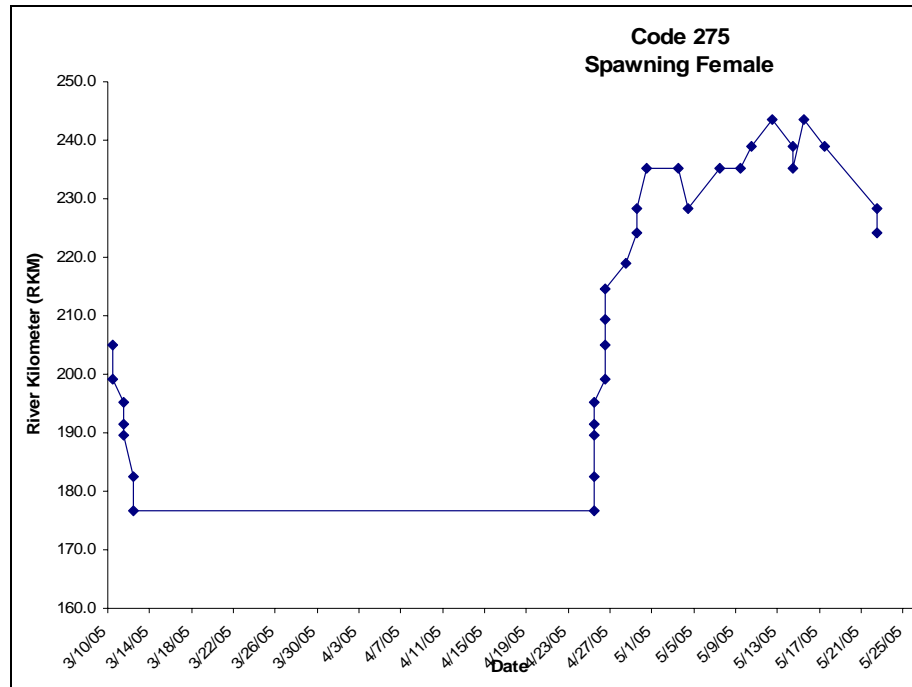


Figure 2. Movement patterns of female white sturgeon in the Kootenai River, Idaho, 2005.

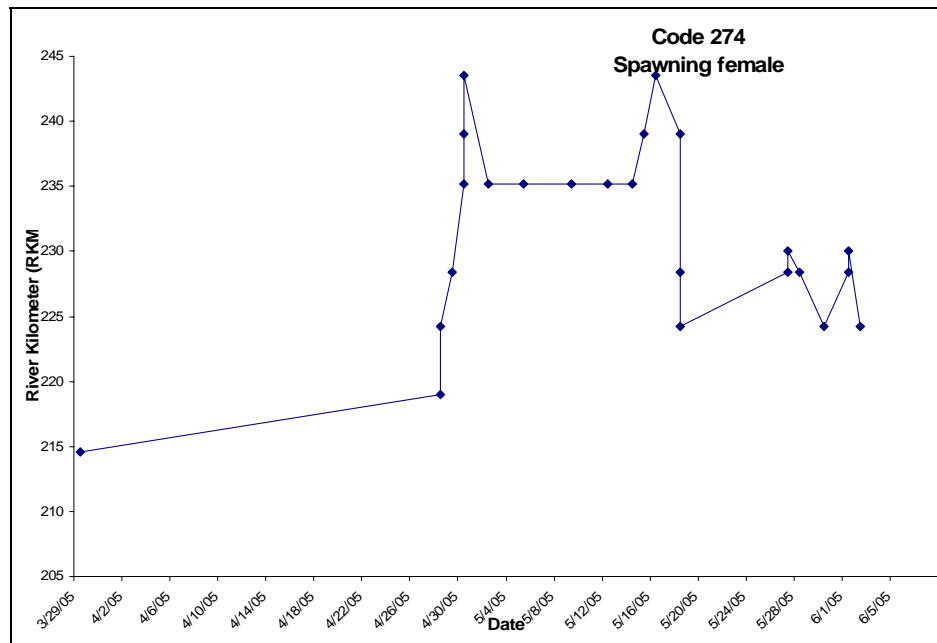


Figure 3. Movement patterns of female white sturgeon in the Kootenai River, Idaho, 2005.

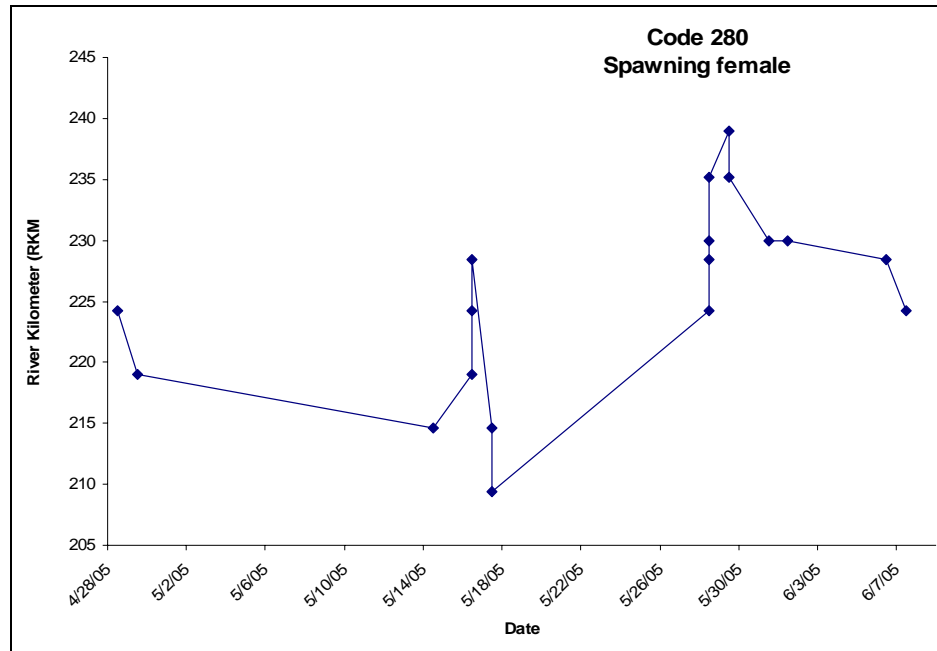


Figure 4. Movement patterns of female white sturgeon in the Kootenai River, Idaho, 2005.



Figure 5. Egg release site 1 at river kilometer 274.5, Kootenai River, Idaho, 2005.

Table 1. Egg release site specifications and water quality parameters from egg release experiment, Kootenai River, Idaho, 2005.

Site	River	Date	Eggs	Release	Release	Mean velocity	Water Temp	Leonía
number	kilometer		released	Time	number	(m/s)	C°	Discharge (cfs)
1	274.5	21-Jun	81,375	7:40 PM	5	2.7 ^a	13.5	27,700
		27-Jun	148,680	3:15 PM	8	2.7	13.5	26,700
		Total	230,055					
2	270.0	22-Jun	102,960	7:40 PM	6	1.8	15.0	27,284
		28-Jun	122,100	6:40 PM	9	1.9	13.0	26,773
		Total	225,060					
3	262.5	23-Jun	251,300	5:22 PM	7	1.5	14.4	27,400
		29-Jun	56,760	4:00 PM	10	n/a	12.8	27,100
		Total	308,060					
4	250.3	2-Jun	61,750	12:11 AM	1	1.8	11.0	18,950
		6-Jun	90,000	8:00 AM	2	1.5	10.0	17,254
		11-Jun	65,625	4:10 AM	3	2.0	12.0	18,352
		18-Jun	76,150	12:30 AM	4	1.8	11.0	29,429
		Total	293,525					
		Total	1,056,700					

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Burbot

Field Work for the 2004-2005 burbot sampling season was concluded. However, burbot status, population characteristics, and extinction risk of burbot was examined using capture-recapture data from 1993-2004 (this was a cooperative project between IDFG, Kootenai Tribe of Idaho, and S.P. Cramer and Associates). The objective was to determine the time remaining before this population becomes functionally extinct and to help guide conservation efforts. A total of 403 burbot were captured from 1993 through 2004 (primarily with baited hoop nets), of which 300 were tagged and released,

31 were not tagged, and 72 were recaptures of fish tagged up to four years prior. Hoop net catch (fish/net day) per unit of effort (CPUE) decline precipitously from 0.054 CPUE in 1996 to 0.008 CPUE in 2004. Mean burbot length increased about 8mm/yr from 516 mm in 1993 to 629 mm in 2004. Two models were developed for capture-recapture analysis, one which included effort data through a series river reaches and one without effort data (Figures 6 and 7). The effort model appeared to be more reliable and suggested an average annual mortality of 63%, an average annual recruitment of 77 fish, and an

average estimate of 148 burbot in the Kootenai River from 1996 through 2004. Average declines in recruitment and population abundance were estimated to be 21% and 14% per year, respectively, resulting in estimates of only 20 recruits and a population size of only 50 burbot in 2004. These data confirm that Kootenai River burbot are in serious decline and may already have passed the point of functional extinction where the population could be expected to recover

if favorable habitat conditions were restored. Although this is very discouraging information it suggests the best prospects for burbot rehabilitation will include introduction of a genetically and behaviorally similar donor stock. Research between IDFG and U of Idaho is underway in the examination of over seven different populations of burbot in the Pacific Northwest to help determine which may be the most suitable donor.

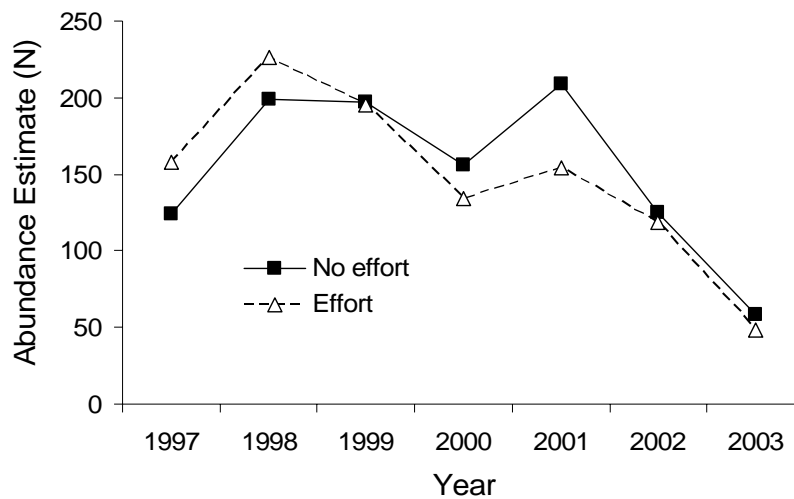


Figure 6. Estimates of Kootenai burbot abundance (N_t) for capture-recapture models (strata 2-5).

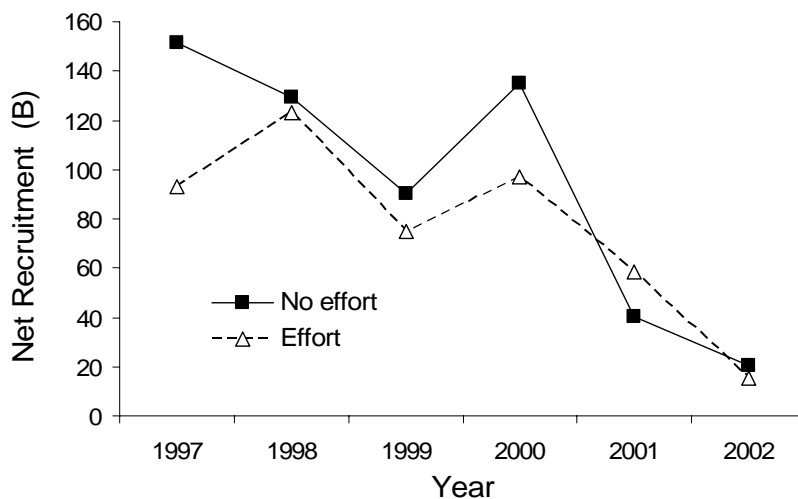


Figure 7. Estimates of Kootenai burbot recruitment (B_t) for capture-recapture models (strata 2-5).

We also examined the movement and behavior of 11 burbot from 1994 through 2004 that had sonic transmitters last for two or more spawning seasons. The objective was to document behavior patterns and to examine how post Libby Dam water temperatures may affect burbot spawning migration. This information could be important to a recent Burbot Conservation Agreement. The Kootenai River is now warmer during winter than it was pre-Libby Dam. Three of the 11 burbot were very mobile and transboundary sometimes entering Kootenay Lake, British Columbia, only to return to the Kootenai River. Only one of the 11 demonstrated an apparent non-spawning or rest year but this could have been due to environmental conditions. Eight of the 11 demonstrated an apparent pre-spawn migration pattern. With one exception the movements were upstream. Six of the eight burbot are thought to have spawned in the Goat River, British Columbia, of which three showed a

consistent pattern of fidelity by entering the river during the spawning season, then returning to an apparent home pool where they remained, and were sedentary until the following autumn. Most burbot began spawning migration when temperatures fell to a range of 3.0 to 4.9 C°. Logistic regression analysis of movement of three of the six sedentary burbot suggested migration to be best correlated to a temperature and discharge model. This study suggests there are two or more behavior patterns and some burbot may have fidelity for specific spawning tributaries (Figure 8). Furthermore, the study suggests changes in the temperature profile of the Kootenai River pre vs. post dam may have set spawning migration back a month and be a possible secondary cause to the burbot population decline. Rehabilitation measures should promote cooler winter temperatures and measures that promote improvements based on numbers of burbot returning to specific spawning tributaries.

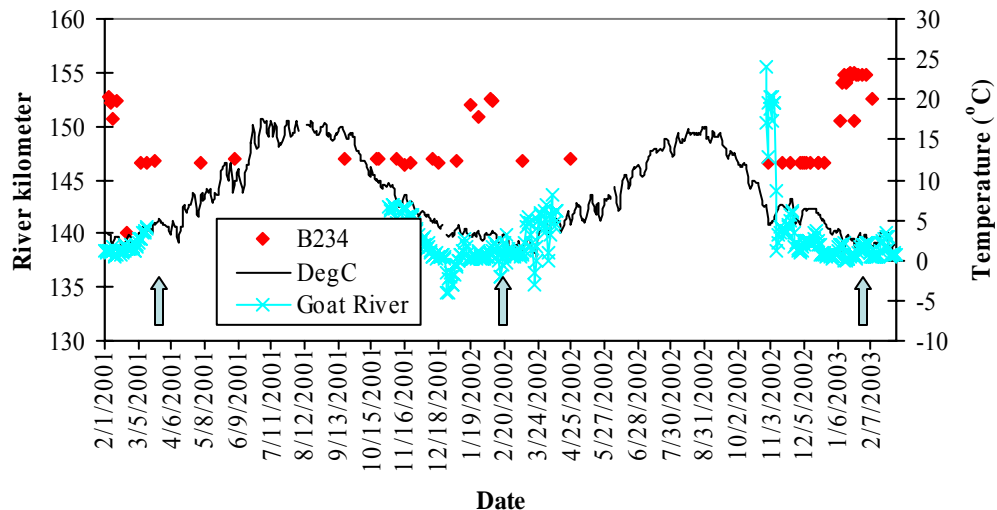


Figure 8. Burbot number 234 and movement from February 2001 through 2003, arrows show entry into Goat River. Degree C is temperature of Kootenai River while Goat River is temperature for that river.

Rainbow and Bull Trout

A creel survey was started on April 1, 2005 and will continue through October. Electrofishing was conducted in April and May to capture rainbow trout for floy-tagging. The tagged fish will be used to help determine the angler exploitation rate for fish ≥ 406 mm (16"). A total of 24 rainbow trout and one rainbowXcutthroat hybrid ≥ 390 mm were floy-tagged. In addition, five rainbow trout and five bull trout were implanted with radio-tags to help determine spawning tributaries (Table

2). Some of these fish also received Vemco sonic tags to help locate them if they migrate to Kootenay Lake. Stream surveys were initiated in June to determine the distribution of westslope cutthroat trout populations in the Kootenai River drainage. Genetics samples were taken from 50 trout collected from each stream. Data from 2004 is still being entered and analyzed, and work was started on the 2004 annual report.

Table 2. Summary of numbers of salmonids caught during electrofishing on the Kootenai River, Idaho, spring 2005.

Species	Number collected	Min. length (mm)	Max. length (mm)	Number radio-tagged	Number floy-tagged
Brook trout	1	114	114	0	0
Brown trout	4	331	485	0	0
Bull trout	15	142	788	5	0
Kokanee	6	179	239	0	0
Rainbow trout	221	84	487	5	24
Rbtwxwt	4	264	442	0	1
Westslope cutthroat trout	4	306	357	0	0

Nutrient restoration

This quarter, work continued on the nutrient addition site below the Idaho/ Montana border at RKM 271. Major construction began on the tank pad, access road, and tanker staging area mid-May. May-June, the containment lock blocks and liners were placed on the pad, followed by the six 2500 gallon and three 2100 gallon tanks for nutrients (6 nitrogen (32-0-0), 2 phosphorous (10-34-0), and one for water (Figure 9). The main work in June consisted of plumbing the tank system, putting the low flow meter control valves in below

the pad, and laying the 285m 12mm pipeline from the flow meters to the Kootenai River in order for it to reach the Idaho State Line. (Figure 9).

In addition to site construction, this quarter was primarily spent securing the last of the permits to hit our July, 05 target starting date. Permits secured included the Stream Channel Alteration Permit from IDWR, USFS Special Use Permit, Short Term Activity Exemption from IDEQ, and Land Easement from IDL.



Figure 9. Nutrient tanks and containment, Leonia, MT.

Meetings Held/Attended, Communication, and Accomplishments for the Quarter:

- Pete participated in several Kootenai River White Sturgeon Recovery Team (KRWSRT) conference calls and meetings and gave program updates.
- Pete assisted USGS with acoustic Doppler current profiling in the canyon reach of the Kootenai River.
- Pete assisted Region 1 fisheries management staff with lake sampling in Boundary County to assess fish populations.
- Pete and Vaughn participated in several conference calls with KRWSRT to discuss Kootenai River white sturgeon and 2005 discharges
- Vaughn attended the CBFWA meeting and presented a paper on Population Dynamics and Extinction risk of burbot in the Kootenai River.
- Vaughn applied for and had the Second International Burbot Symposium accepted for the 2005 annual AFS meeting

- Vaughn attended a KR white sturgeon and bull trout Biop meeting in Bonners Ferry in March
- Vaughn attended a BPA SOW and Pisces workshop in Spokane
- Pete assisted USGS with Acoustic Doppler Current Profiling in proposed embryo release sites
- Vaughn had two news interviews and one radio interview
- In June Vaughn attended the KVRI a meeting in Bonners Ferry
- Ryan, Vaughn, and Charlie Holderman of KTOI met again with Peter Ward the Canadian engineering contractor assisting with nutrient restoration
- Ryan had frequent meetings with BPA, KTOI, and the public for the ecosystem project needs.
- Jody attended the TMDL meeting in Bonners Ferry.
- Jody had a ms. he senior authored, on rainbow trout recruitment from the tributaries in Idaho to the Kootenai River accepted for publication in Northwest Science. Jr. authors were Chris Downs, Jim Fredericks, and Vaughn
- Jody and Dean Holecek coauthored a presentation on rainbow trout redd characteristics presented by Dean at the Native Fish Conference in Spokane.
- Vaughn and Diane had a ms. accepted for publication in Northwest Science on single vs. dual tagging and tag loss on white sturgeon
- Jody wrote a news release on the Kootenai River creel survey.
- Jody participated in the TMDL meeting for the Kootenai and Moyie river drainages.
- Ryan presented Kootenai River Nutrient restoration talk at the 29th International Kokanee Workshop June 7th.

Next Quarter Activities and Meetings:

White sturgeon

- Adult sampling
- Telemetry
- Embryo release
- Larval sampling
- Report writing and data management

Rainbow and Bull Trout

- Continue creel survey on the Kootenai River.
- Equip new boat for fall shocking which will begin in September.
- Continue stream survey work to collect westslope cutthroat trout genetics samples.
- Continue entering and summarizing 2004 data.
- Continue writing the 2004 annual report.

Burbot

- Begin larval tows and light traps will continue into early February

- Revise 04 Annual Burbot Report and begin the 05 annual report
- Complete drafts of burbot demographics and burbot spawning fidelity ms. for Second International Burbot Symposium
- Continue with coordination with the University of Idaho and burbot DNA analysis

Ecosystem Rehabilitation

- Start nutrient additions to the Kootenai River.
- Continue Bio-monitoring through the growing season.
- Fall electro-fishing; the first post treatment fish information collected to date.

Cc. Lee Watts & Scott Bettin (BPA)
 Sue Ireland (KTOI)
 Colin Spence (BC Fisheries)
 Brian Marotz (MFWP, Kalispell)
 Jeff Laufle & Greg Hoffman (USACE)
 Steve Duke, Bob Hallock (USFWS)
 Virgil Moore, Steve Yundt, Ned Horner, Chip Corsi, Greg Johnson, Fred Partridge,
 (IDFG)
 Gary Barton (USGS)
 Boundary County Commissioners